Amendment and Response
Applicant: Raymond H. Kraft
Serial No.: 10/800,420
Filed: March 12, 2004
Docket No.: A126.253.102
Title: SYSTEM AND METHOD OF NON-LINEAR GRID FITTING AND COORDINATE SYSTEM MAPPING

REMARKS

This is responsive to the Final Office Action mailed June 19, 2008 and is in support of the concurrently filed Request for Continued Examination. In that Office Action, claims 1-3 and 16-18 were rejected under 35 U.S.C. §102(b) as being anticipated by Segman, U.S. Patent No. 6,178,272 ("Segman"). Claims 4 and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Segman in view of Kwon et al., U.S. Patent No. 5,091,972 ("Kwon"). Claims 6 and 7 were rejected under 35 U.S.C. §103(a) as being unpatentable over Segman in view of Correa et al., U.S. Patent No. 6,340,114 ("Correa").

With this Response, claims 1 and 16 have been amended; claims 8-15 cancelled; and claims 21-28 added. Claims 1-7, and 16-28 remain pending in the application and are presented for reconsideration and allowance.

35 U.S.C. §§102, 103 Rejections

Independent claims 1 and 16 have been amended to recite that data acquired by an imaging apparatus is, "captured such that features are positioned in space relative to the fiducal plate". Furthermore, these claims have been amended to recite that an absolute location of identified acquired image feature centers is calculated relative to the fiducial plate in fiducial plate coordinates. It is important to note that absolute locations are defined by fiducials on the fiducial plate. As previously discussed, Segman does not teach or suggest physical elements or structured required by claims of the present application. Instead, Segman is directed to mathematical methods that are to be applied in a field of endeavor that is different from the field of the presently claimed inventions. Segman deals with resolution issues associated with image scaling, and in particular, to the problems that accrue from mathematical scaling and transforming an image to obtain an output aspect ratio that is different from a corresponding input aspect ratio. Segman describes it thusly:

> "New screens are now available in the market with aspect ratios such as 16:9 or 21:9. High Definition TV screens typically have an aspect ratio of 16:9. In order to present images of one aspect ratio, for example 4:3, on displays having a different aspect ratio, for example 16:9, a sophisticated transformation that converts the image between aspect ratios is needed."

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Graphically, Segman's conversion process changes an image from a first aspect ratio (e.g. "Academy Flat") to a second aspect ratio (e.g. Panavision/Cinemascope) or vice versa.

Images taken from http://www.thedigitalbits.com/articles/anamorphic/aspectratios/widescreenorama.html

Segman overlays a virtual grid on an image and translates the image to a second virtual grid having a different aspect ratio. The Office Action asserts that an image grid is akin to a fiducial plate and that no such requirements of a physical fiducial plate are claimed by the applicant. The present invention clearly describes and claims imaging an object through a real fiducial plate and with this Amendment, claims 1 and 16 have been clarified to more clearly recite a physical fiducial plate wherein an imaging apparatus captures image data such that features are positioned and spaced relative to the fiducial plate. Furthermore, calculation of an absolute location of image feature centers is made relative to the real fiducial plate. Applicant asserts that this amendment is made for clarification purposes only and does not limit the scope of the claims.

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Because the grids used by Segman are virtual, arbitrarily sized and may be changed on a whim, it is difficult to imagine how one can calculate absolute locations of acquired image feature centers in fiducial plate coordinates that are positioned relative to the fiducial plate. The entire point of Segman is that there are no absolute coordinates with respect to an image, only a relationship between arbitrary coordinate systems, e.g. input grids and output grids.

In contrast, features recited in claim 1 calculate an absolute location of acquired image center features in fiducial plate coordinates. There is simply no teaching to anticipate or reasonably make obvious calculation of an absolute location in Segman, as Segman is concerned with pixels being in either an input grid space or an output grid space, but not both. For at least these reasons, claims 1 and 16 are allowable. Dependent claims 2-7 and 17-20 are also allowable at least based on the relationship to their respective independent claims. Thus, independent claims 1 and 16 and their respective dependent claims are allowable.

Newly Presented Claims

With regard to claim 21, this claim recites performing multiple iterations of identifying coordinates and calculating an absolute location of identified acquired image feature centers. The Office Action cites Figure 3 of Segman as teaching iterations for calculating an absolute location. However, the "iteration" is only performed once for each pixel and thus simply do not teach, suggest or reasonably make obvious performing multiple iterations for a single pixel. For at least these reasons, claim 21 is allowable.

Independent claims 22 and 25 are directed to a method and probe card testing system, respectively. Claim 22 recites positioning features relative to the set of fiducials on the fiducal plate as well as steps of requiring, establishing and calculating. As discussed above, Segman merely overlays an image with a grid and simply does not position features relative to the grid nor does it teach, suggest or reasonably make obvious positioning features relative to a set of fiducials on a fiducial plate. As a result, independent claim 22 is allowable. Independent claim 25 recites a fiducial plate having a set of fiducals positioned thereon and an imaging apparatus adapted to acquire image data of a fiducial plate and features positioned relative to the set of

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fiducials. Segman simply does not teach, suggest or reasonably make obvious a fiducial plate or imaging apparatus as claimed. As such, independent claim 25 is believed to be allowable. Dependent claims 23, 24 and 26-28 are allowable at least based on the relationship to their respective independent claims.

CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 1-7 and 16-28 are in form for allowance and are not taught or reasonable made obvious by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 1-7 and 16-28 is respectfully requested.

No fees are required under 37 C.F.R. 1.16(h)(i). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 50-0471.

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment and Response should be directed to Todd R. Fronek at Telephone No. (612) 767-2522, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

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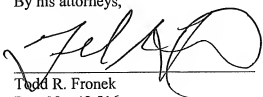> Minneapolis, MN 55402

Respectfully submitted,

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By his attorneys,

Date: 9/19/08

TRF:skh

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